Subject: [Fwd: LFA Comments]
Date: Mon, 04 Jun 2001 10:47:35 -0400
From: "Patricia Lawson" <Patricia.Lawson@noaa.gov>
Organization: NOAA
To: Ken Hollingshead <Ken.Hollingshead@noaa.gov>,
Janet Whaley <Janet.Whaley@noaa.gov>

I saw this on Marmam and thought you would want to see it.

Subject: LFA Comments
Date: Sun, 3 Jun 2001 12:04:44 EDT
From: Joe Blue <JBlue46498@aol.com>
Reply-To: Marine Mammals Research and Conservation Discussion <MARMAM@UVVM.UVIC.CA>
To: MARMAM@UVVM.UVIC.CA

--part1_d8.73ab3cf.284bba1c_boundary
Content-Type: text/plain; charset="US-ASCII"
Content-Transfer-Encoding: 7bit

I am forwarding my LFA comments.

Joe Blue

Ms. Donna Wieting
Chief, Marine Mammal Conservation Division
Office of Protected Resources
National Marine Fisheries Service
Silver Spring, MD 20910-3226 USA

Dear Ms. Wieting:

Let me introduce myself. My name is Joseph E. Blue. I have my BS degree in physics with majors also in biology, chemistry and mathematics, my MS in engineering science with my thesis being on Acoustic Cavitation and Bubble Instabilities and my Ph.D. in mechanical engineering with an engineering acoustics option.

I am a former member of the Navy Civil Service Senior Executive Service (SES). In that position I was in charge of the Underwater Sound Reference Detachment (USRD) of the Naval Research Laboratory which became the Underwater Sound Reference Division of the Naval Undersea Warfare Center Division Newport? The USRD was the lead laboratory for SPAWAR in contracting for the first 18 LFA projectors. During that procurement process, an LFA projector was tested at high levels (~207 dB re 1 mPa at 1 m) in USRD's Lake Gem Mary Facility in Orlando. This test was conducted while I was on travel as I would have not allowed it had I been informed in advance that it was going to be done. When I returned, I received several telephone calls from neighbors complaining about rattling dishes, items dancing on shelves and fear of structural damage to their home foundations. I banned any further high power tests in the USRD facilities.

I am generally in favor of sonar systems as I have seen where better sonar could have prevented many combat deaths. However, from my 40 years of experience in underwater acoustics, I have learned that sonar can be dangerous to humans and sea animals in ways that most people associated with the development of these systems cannot imagine. I also learned that the focus is on systems that work with little thought to negative environmental consequences by engineers and scientists who are not familiar with the biological aspects of sound in the sea. The reward system is for positive results, not for pointing out the negative. Such, I fear based on my experience, has been the case for LFA. LFA might be an important system if

should not be allowed to proceed under the currently proposed FEIS. LFA has the potential of doing great harm, not only to marine mammals, but also to the many people who derive their livelihood and food from the sea.
A potentially fatal flaw in the analysis of LFA effects by biologists hired by SPAWAR as bioacousticians is their lack of understanding of acoustics as a branch of physics. That leads them to the use of anecdotal observations that, in the case of LFA, is not supported by a large enough database to arrive at statistically significant conclusions necessary for the SPAWAR nor the opposing sides of this issue to feel confident enough to proceed. A case in point is the insistence by the SPAWAR LFA office that enough testing has been done to ascertain the safety of the system to marine life. Even that small amount would not have been done if it were not for the insistence by environmentalists that sonar was killing marine mammals. Until the stranding of many marine mammals during Navy exercises in the Caribbean, the Navy attempted to blame every stranding as due to causes other than sonar. Not until the Navy was presented with proof that the stranding was due to sonar did it get serious about sonar stranding evidence. Even now, the Navy tries to isolate the damaging effects to frequency regimes. Examination of Minnaert's equation for relating bubble size to resonance frequencies shows that there are air cavity volumes of all sizes that may resonate in marine mammals and other sea life. When acoustic displacements get large enough in a sea life form, tissue tearing will occur. One cannot define an absolute displacement size for this to occur because the significance of the displacement depends on the size of the organism and the level of the excitation source. Thus, it is not sufficient to say that LFA is safe because it is a different frequency regime that the sonars that caused the Caribbean stranding phenomena. That represents a gross misunderstanding of the resonance process.
Further, not all marine life damage can be attributed to air cavity resonance alone. Damage to hearing apparatus of marine mammals such as uncovered by Dr. Darlene Ketten from Woods Hole illustrates my point. The entry to the brain and on to the hearing apparatus was through a nerve foramen from a sinus cavity. The air cavity of the sinus will not vibrate as a bubble because the bony sinus cavity presents a different acoustical impedance to the sonar. The whole of the lung/bronchial tubes/trachea/sinus/air-volume complex must be considered. Modeling of this complex air volume may be possible by considering the lung to vibrate like a bubble and the remaining part act as a Helmholtz resonator. A coupled resonant system such as this can explain the punch through at the nerve foramen site which is soft compared to the bony sinus cavity thus concentrating the displacement on the soft foramen site into the brain where Ketten observed the bloody mass and hearing apparatus trauma.
SPAWAR's contention that no damage has been done during LFA tests because of lack of evidence of marine mammal deaths is not convincing. The endangered right whale apparently escaped harm as they float when killed as opposed to most other whales that sink when killed. Many unrecorded deaths would go unnoticed if they sank rather than strand themselves.

The LFA system idea was hatched during the Cold War. The threat from quiet diesel submarines from rogue nations may be better addressed by the military intelligence community and lower power shorter range systems. The end of the Cold War should have caused a more thorough examination of LFA rather than following the lead of the military/industrial complex that Eisenhower warned us about. Apparently, the threat was redefined from the original cold war to rogue nation threats to allow the LFA program to continue. My belief is that there are more pressing security problems that are not being pursued where the money being spent on LFA should be channeled.

Sincerely,
Joseph E. Blue, Ph.D.
3313 Northglen Drive
Orlando, FL 32806
Telephone: (407) 851-4105
FAX: (407) 850-2075
Email: jblue46498@aol.com

```
--part1_d8.73ab3cf.284bba1c_boundary
Content-Type: text/html; charset="US-ASCII"
Content-Transfer-Encoding: 7bit

<HTML><FONT FACE=arial,helvetica><FONT  SIZE=2>I am forwarding my LFA comments.
<BR>
<BR>Joe Blue
<BR>
<BR>Ms. Donna Wieting
<BR>Chief, Marine Mammal Conservation Division
<BR>Office of Protected Resources
<BR>National Marine Fisheries Service
<BR>Silver Spring, MD 20910-3226 USA
<BR>
<BR>Dear Ms. Wieting:
<BR>    Let me introduce myself. My name is Joseph E. Blue. I have my BS degree
<BR>in physics with majors also in biology, chemistry and mathematics, my MS in
<BR>engineering science with my thesis being on Acoustic Cavitation and Bubble
<BR>Instabilities and my Ph.D. in mechanical engineering with an engineering
<BR>acoustics option.
<BR>I am a former member of the Navy Civil Service Senior Executive Service
<BR>(SES). In that position I was in charge of the Underwater Sound Reference
<BR>Detachment (USRD) of the Naval Research Laboratory which became the
<BR>Underwater Sound Reference Division of the Naval Undersea Warfare Center
<BR>Division Newport? The USRD was the lead laboratory for SPAWAR in contracting
<BR>for the first 18 LFA projectors. During that procurement process, an LFA
<BR>projector was tested at high levels (~207 dB re 1 mPa at 1 m) in USRD's Lake
<BR>Gem Mary Facility in Orlando. This test was conducted while I was on travel
<BR>as I would have not allowed it had I been informed in advance that it was
<BR>going to be done. When I returned, I received several telephone calls from
<BR>neighbors complaining about rattling dishes, items dancing on shelves and
<BR>fear of structural damage to their home foundations. I banned any further
<BR>high power tests in the USRD facilities.
<BR>I am generally in favor of sonar systems as I have seen where better sonar
<BR>could have prevented many combat deaths. However, from my 40 years of
<BR>experience in underwater acoustics, I have learned that sonar can be
<BR>dangerous to humans and sea animals in ways that most people associated with
<BR>the development of these systems cannot imagine. I also learned that the
<BR>focus is on systems that work with little thought to negative environmental
<BR>consequences by engineers and scientists who are not familiar with the
<BR>biological aspects of sound in the sea. The reward system is for positive
<BR>results, not for pointing out the negative. Such, I fear based on my
<BR>experience, has been the case for LFA. LFA might be an important system if
<BR>alternatives to it cannot be found. However, in my scientific opinion, LFA
<BR>should not be allowed to proceed under the currently proposed FEIS. LFA has
<BR>the potential of doing great harm, not only to marine mammals, but also to
<BR>the many people who derive their livelihood and food from the sea.
<BR>A potentially fatal flaw in the analysis of LFA effects by biologists hired
<BR>by SPAWAR as bioacousticians is their lack of understanding of acoustics as a
<BR>branch of physics. That leads them to the use of anecdotal observations that,
<BR>in the case of LFA, is not supported by a large enough database to arrive at
<BR>statistically significant conclusions necessary for the SPAWAR nor the
<BR>opposing sides of this issue to feel confident enough to proceed. A case in
<BR>point is the insistence by the SPAWAR LFA office that enough testing has been
<BR>done to ascertain the safety of the system to marine life. Even that small
<BR>amount would not have been done if it were not for the insistence by
<BR>environmentalists that sonar was killing marine mammals. Until the stranding
<BR>of many marine mammals during Navy exercises in the Caribbean, the Navy
<BR>attempted to blame every stranding as due to causes other than sonar. Not
<BR>until the Navy was presented with proof that the stranding was due to sonar
<BR>did it get serious about sonar stranding evidence. Even now, the Navy tries
<BR>to isolate the damaging effects to frequency regimes. Examination of
<BR>Minnaert's equation for relating bubble size to resonance frequencies shows
<BR>that there are air cavity volumes of all sizes that may resonate in marine
```


mammals and other sea life. When acoustic displacements get large enough in a

sea life form, tissue tearing will occur. One cannot define an absolute

displacement size for this to occur because the significance of the

displacement depends on the size of the organism and the level of the

excitation source. Thus, it is not sufficient to say that LFA is safe because

it is a different frequency regime that the sonars that caused the Caribbean

stranding phenomena. That represents a gross misunderstanding of the

resonance process.

Further, not all marine life damage can be attributed to air cavity resonance

alone. Damage to hearing apparatus of marine mammals such as uncovered by Dr.

Darlene Ketten from Woods Hole illustrates my point. The entry to the brain

and on to the hearing apparatus was through a nerve foramen from a sinus

cavity. The air cavity of the sinus will not vibrate as a bubble because the

bony sinus cavity presents a different acoustical impedance to the sonar. The

whole of the lung/bronchial tubes/trachea/sinus/air-volume complex must be

considered. Modeling of this complex air volume may be possible by

considering the lung to vibrate like a bubble and the remaining part act as a

Helmholtz resonator. A coupled resonant system such as this can explain the

punch through at the nerve foramen site which is soft compared to the bony

sinus cavity thus concentrating the displacement on the soft foramen site

into the brain where Ketten observed the bloody mass and hearing apparatus

trauma.

SPAWAR's contention that no damage has been done during LFA tests because of

lack of evidence of marine mammal deaths is not convincing. The endangered

right whale apparently escaped harm as they float when killed as opposed to

most other whales that sink when killed. Many unrecorded deaths would go

unnoticed if they sank rather than strand themselves.

  The LFA system idea was hatched during the Cold War. The threat from

quiet diesel submarines from rogue nations may be better addressed by the

military intelligence community and lower power shorter range systems. The

end of the Cold War should have caused a more thorough examination of LFA

rather than following the lead of the military/industrial complex that

Eisenhower warned us about. Apparently, the threat was redefined from the

original cold war to rogue nation threats to allow the LFA program to

continue. My belief is that there are more pressing security problems that

are not being pursued where the money being spent on LFA should be channeled.

Sincerely,

Joseph E. Blue, Ph.D.

3313 Northglen Drive

Orlando, FL 32806

Telephone: (407) 851-4105

FAX: (407) 850-2075

Email: jblue46498@aol.com

</FONT></HTML>

--part1_d8.73ab3cf.284bba1c_boundary--